DEVELOPMENT OF SORBENT BED ASSEMBLY FOR A PERIODIC 10K SOLID HYDROGEN CRYOCOOLER. L. A. Wade, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA 91109, R. C. Bowman, Jr., D. R. Gilkinson, and P. H. Sywulka, Aerojet Electronic Systems Division, Azusa, CA 91702. A closed-cycle 10K sorption cryocooler is being fabricated for microgravit y testing during a future space shuttle mission. A critical component of this cryogenic refrigerator is the metal hydride sorbent bed assembly (SBA). The SBA uses hydrides which absorb hydrogen gas at low pressure, (i.e., about 0.25 MPa from liquid hydrogen at 25K and below 0.2 kPa from solid hydrogen near 10K) and subsequent] y delivers hydrogen at nearl y 10 MPa to a storage reservoir to repeat the Joule-Thomson (J-T) expansion process. The SBA includes three independent hydride beds where two contain $LaNi_{4.8}Sn_{0.2}$ alloy and the third contains ZrNi. Detailed descriptions will be given for the three beds, which have specialized design features to enhance performance at each step of operation. In particular, two beds must rapid] y absorb hydrogen in order for the J-T cold stage to reach 10K within two minutes from a 65K holding temperature. Performance characterization results will be compared to model analyses of the SBA.

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